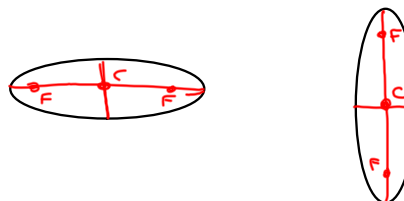
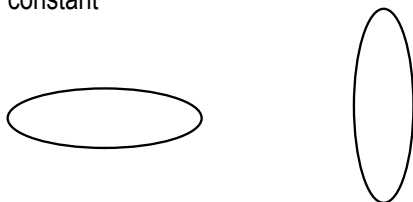


8.4 Ellipses

Ellipse--the set of all points such that the sum of the distances from a point to two fixed points (foci) is a constant

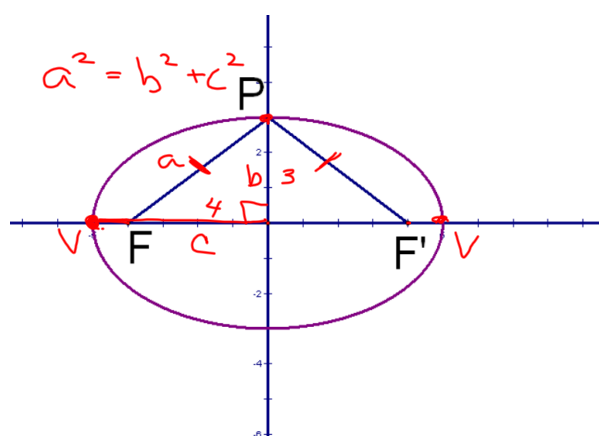


Axes are parallel to the coordinate axes

$2a$ = length of major axis

$2b$ = length of minor axis

c = distance from center to foci



Horizontal Ellipse

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

Vertical Ellipse

$$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$$

$$a > b > 0$$

$$C(h, k)$$

$$a^2 = b^2 + c^2$$

$2a$ = sum of focal radii

Vertices-endpoints of major axis

GSP

Reflective properties

http://www.ies.co.jp/math/java/conics/focus_ellipse/focus_ellipse.html

$$\frac{(x)^2}{9} + \frac{(y)^2}{16} = 1$$

$$c(0,0)$$

$$a=4$$

$$b=3$$

$$c=\sqrt{5}$$

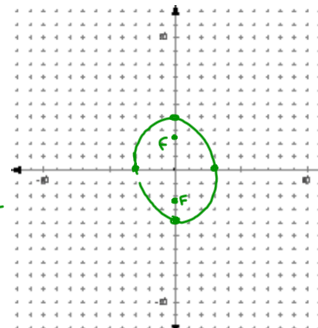
$$F_1(0, \sqrt{5})$$

$$F_2(0, -\sqrt{5})$$

$$a^2 = b^2 + c^2$$

$$16 = 9 + c^2$$

$$7 = c^2$$



$$\frac{(x-4)^2}{25} + \frac{(y+5)^2}{16} = 1$$

$$c(4, -5)$$

$$a=5$$

$$b=4$$

$$c=3$$

$$F_1(7, -5)$$

$$F_2(1, -5)$$

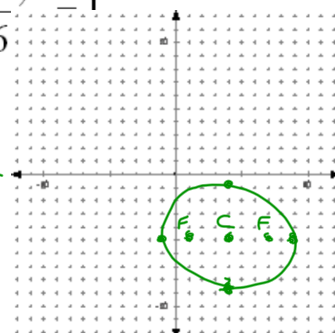
$$a^2 = b^2 + c^2$$

$$5^2 = 4^2 + c^2$$

$$25 = 16 + c^2$$

$$9 = c^2$$

$$3 = c$$



$$9x^2 + 4y^2 - 18x + 16y - 11 = 0$$

$$9x^2 - 18x + 4y^2 + 16y = 11$$

$$9(x^2 - 2x + 1) + 4(y^2 + 4y + 4) = 11 + 9 + 16$$

$$9(x-1)^2 + 4(y+2)^2 = 36$$

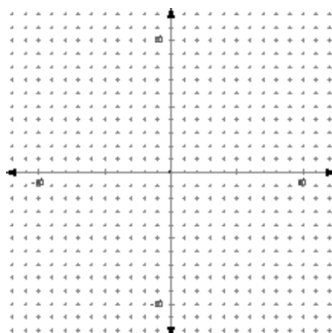
$$\frac{(x-1)^2}{4} + \frac{(y+2)^2}{9} = 1$$

C _____

a _____

b _____

c _____

F₁ _____F₂ _____

Write the equation of an ellipse with
a C(0,0) and a horizontal major axis.

$$a = 6$$

$$b = 4$$

$$\frac{x^2}{36} + \frac{y^2}{16} = 1$$

Write the equation of an ellipse with
x-intercepts of ± 3 and y-intercepts
of ± 2

$$C(0,0)$$

$$\frac{x^2}{9} + \frac{y^2}{4} = 1$$

Write the equation of an ellipse with
Foci, F(-2, 0) and F(2, 0) and a = 7

$$C(0,0)$$

$$c = 2$$

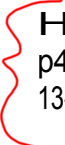
$$a = 7$$

$$a^2 = b^2 + c^2$$

$$49 = b^2 + 4$$

$$45 = b^2$$

$$\frac{x^2}{49} + \frac{y^2}{45} = 1$$



HW
p438
13-21 odd, 29, 31, 35

Attachments

ellipse.gsp

ellipse(1).gsp